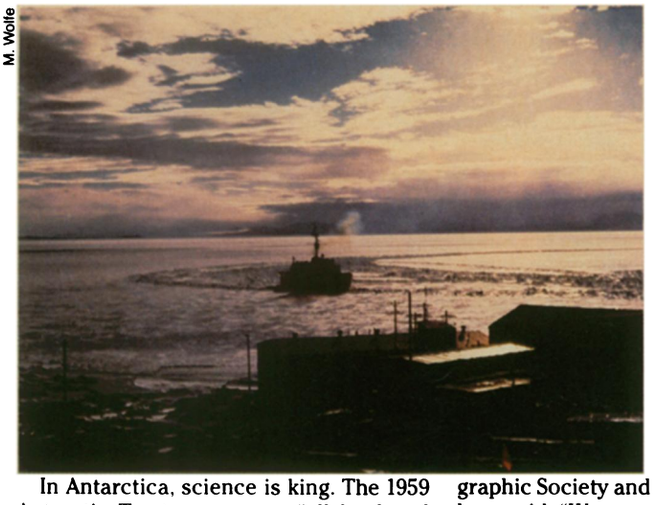
Who Should Rule

Science in Antarctica may be in jeopardy

By MARTHA WOLFE

M. Wolfe



A U.S. Coast Guard icebreaker arrives at the main U.S. Antarctic station in late February carrying supplies for winter-over personnel.

In Antarctica, science is king. The 1959 Antarctic Treaty preserves "all land and ice shelves under 60° South latitude — the Antarctic Convergence — for peaceful purposes on the basis of freedom of scientific investigation." This austral summer — October to February — the United States Antarctic Research Progam will spend $86.4 million, sending four supply ships, 10 LC-130 and C141 cargo aircraft, seven helicopters, 675 military personnel and 506 civilian contractors to Antarctica to support 244 scientists working on 89 projects. Field stations on "the ice" are polar think tanks where scientists are pampered with abundant, sometimes copious, supplies and support personnel.

But within this decade scientists may lose their Antarctic sovereignty to the world's hunger and thirst for protein and petroleum. The Antarctic Convergence serves not only as the political boundary to an international treaty, but the physical boundary to a virtually isolated ecosystem. Within the convergence lies a protein deposit, in the form of a tiny crustacean called krill, estimated to be twice the size of the current world fish catch. In addition, geologists in 1977 boldly speculated that there are "tens of billions of barrels of recoverable oil" in Antarctica. Sufficiently piqued, international interest in untapped resources has turned attention south, firmly placing the Antarctic Treaty on thin ice.

Historically, an ambivalent hunger for national glory and scientific knowledge has driven people to Antarctica. Early 18th century explorers, searching for an inhabitable southern paradise of spices, included in their expeditions geologists, astronomers and naturalists. In 1907 Ernest Shackleton, a British explorer, made the first push to the South Pole. His quest for the pole failed but his expedition brought back fossils that have fueled many scientific expeditions since: evidence that the continent was once a temperate one.

When British explorer Robert Scott and Norwegian Roald Amundsen held their 1910 race to the pole, their expeditions also paid homage to science. Scott's expedition was backed by the Royal Geographic Society and one of his party members said, "We were primarily a great scientific expedition, with the pole as our bait of public support." Amundsen, the winner of the race, was admittedly more single-minded in his pursuit for the pole but his expedition also collected rock samples and conducted oceanographic experiments. Douglas Mawson, an Australian contemporary of Scott and Amundsen, was the first scientist to lead an Antarctic expedition. Ironically, he was more interested in staking territorial claims.

The British, in 1908, were the first to claim a piece of the Antarctic pie as their own. Between 1923 and 1943 six other countries — New Zealand, France, Australia, Norway, Chile and Argentina — sliced more pieces, sometimes overlapping their claims. During this time, Admiral Richard Byrd mounted the first two of his four historic airplane expeditions over the pole. These first two expeditions catered heavily to science but, as World War II drew closer, military and strategic pressures began to increase. On Byrd's third expedition, just before the United States entered the war, President Roosevelt ordered all of the admiral's scientific associates to hand over their journals and even their specimens for security purposes. By Byrd's fourth expedition a clear shift in emphasis to military priorities had taken hold. Meanwhile, Britain had established two military bases on the ice.

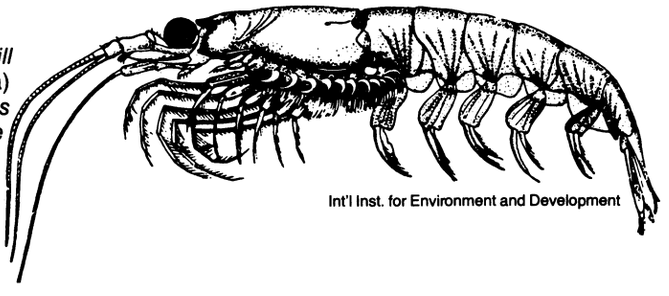
"In the early 1950s," writes Philip W. Quigg in his recent book *A Pole Apart: The Emerging Issue of Antarctica,* "scientists had reason to believe that military strategy and territorial claims had come to dominate the thinking of national governments and that science was becoming more a rationale than a priority."

These political and military urges were temporarily squelched in July 1957 when 12 nations, realizing that much time exploring Antarctica's frozen secrets had been lost between world wars, gathered their polar researchers together for a year-long cooperative scientific assault on Antarctica. This, the International Geophysical Year (IGY), was hugely successful and in December 1959 those 12 nations — Argentina, Australia, Belgium, Chile, France, Japan, New Zealand, Norway, South Africa, the Soviet Union, the United Kingdom and the United States — signed the Antarctic Treaty, an unprecedented, verifiable and equitable treaty of disarmament, environmental protection and freedom of information. All territorial claims were effectively frozen.

Under the treaty, the 12 original signatories became the Antarctic Treaty Consultative Parties (ATCPs). Though it is a United Nations-chartered treaty, and all UN member nations are encouraged to accede (13 have done so), the consultative parties hold exclusive voting rights governing activities in Antarctica; hence, their nickname "the club." Acceding nations can only obtain consultative status by "demonstrating substantial scientific interest in Antarctica," and by unanimous vote from the ATCPs. East Germany, Poland and most recently Brazil and India have achieved consultative status, bringing the club's number to 16.

The consultative parties meet, in private, every two years to discuss recommendations concerning the treaty. During the past decade's atmosphere of growing international interest in resources, the consultative parties had the forethought to negotiate ways of protecting the continent against resource exploitation. Two special conventions, one to protect Antarctic seals and another broader one to protect "Antarctic marine living resources," have been adopted. A third minerals regime is under negotiation.

But the treaty nations historically have surrounded their talks with secrecy. Until this year, not even the nonconsultative acceding nations were allowed delegates. This secrecy has attracted the ire of the UN's developing nations, the group of 77 as



Int'l Inst. for Environment and Development

The population of krill (Euphausia superba) *in Antarctica's waters is estimated at twice the world's current fist catch.*

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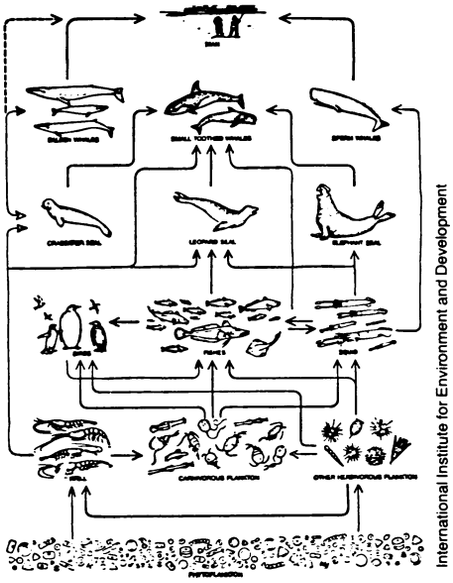


International Institute for Environment and Development

The Southern Ocean's food chain, the world's largest coherent ecosystem, is deceivingly simple.

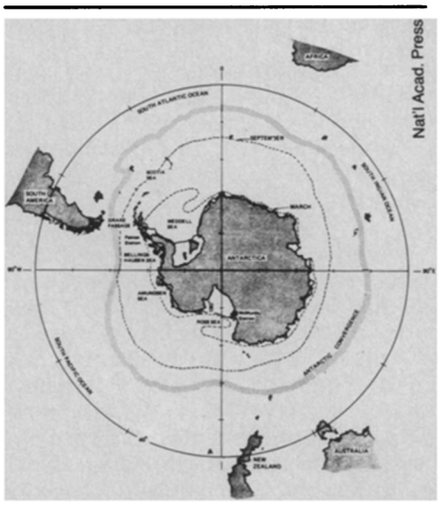
they are called there. Spurred by the Law of the Sea Treaty's phrasiology claiming the resources in the open seas as "the common heritage of mankind," the Group of 77 is calling for a change in Antarctica's political status quo. Until now, the treaty has successfully protected Antarctica against exploitation of anything except knowledge.

Forty international stations across the continent are continuing the IGY's example of scientific cooperation. But the focus of their efforts is changing from one of basic research to projects aimed at resources and the effects of exploitation — as suggested in a 1974 U.S. National Security Council memorandum which stated that the mineral resources of Antarctica should be assessed. "The two polar regions are extremely important in understanding how earth's environmental ecosystem works," explains Edward Todd, Director of the National Science Foundation's (NSF) Division of Polar Programs, the clearinghouse of financial and logistical support for U.S. Antarctic researchers. "Until recently basic science has been the primary interest in Antarctica. Now the emphasis is changing toward resources. We have not been directed to go out and prospect; we intend to maintain a balanced scientific program. But we also know if we understand the systems, we can better predict the effects of exploitation."

Overseeing science in Antarctica is the Scientific Committee on Antarctic Research (SCAR), a branch of the International Union of Scientists formed the same year the Treaty was signed. SCAR, which is made up of a board of specialists in different branches of Antarctic study, is a nongovernmental body whose charge is to make recommendations to the 16 consultative parties on the types of scientific research they should encourage. Currently, biology, glaciology, meterology, and the upper atmospheric, ocean and earth sciences are the main interests of Antarctic scientists. In its lifetime SCAR has watched and guided the uncovering of Antarctica's role in the earth's ecosystem and is now emphasizing that only the tip of that iceberg is understood.

The immense and heavy shield of moving ice that covers Antarctica is up to two miles thick. The weight forces most of the continent below sea level—some troughs dip to a 6,500 foot depth. It is an arid landmass, circumnavigated by a clockwise ocean current thought to be instrumental in governing the rest of the earth's weather and ocean movement. Terrestrially, the continent is a "desert" inhabited by arthropods, lichens and algae that have assumed some novel adaptations for protection against weather extremes of −50°C and 200 mph winds (SN: 4/24/82, p. 273). Within the Southern Ocean is an ecosystem exhibiting overall low and slow productivity throughout the food chain except for patches of intense activity that follow the edge of the seasonally waxing and waning ice sheet. This hyperactive ice-edge food chain consists of phytoplankton and zooplankton (krill) that nourish fish, squid, marine mammals and birds. Simple as it seems, marine scientists as yet cannot delineate the factors controlling population fluctuations, nor do they know the habits of most species, including the all-important krill.

Geologists and upper atmospheric scientists are perhaps the most advanced in their Antarctic knowledge. The theory that Antarctica was once part of a giant continent joined to Australia and South America as recently as 55 million years ago was confirmed in 1982 by the discovery of the remains of a late Paleocene land mammal, an extinct marsupial in the family Polydolopidae (SN: 3/27/82, p. 213). Fossils of land and marine reptiles and bony fishes have also been discovered in the region of the Antarctic Peninsula, south of Tierra del Fuego, South America. The ice itself holds an immaculately kept record of the earth's climatic history. Ice cores from the polar plateau have divulged meterological data from as long as 30,000 years ago (SN: 5/10/80 p. 296). Because of the ionospheric currents that converge there, upper atmospheric scientists at the South Pole find themselves in the ideal place to study the particle physics of auroras, cosmic rays and whistlers—plasma disturbances traveling in the earth's magnetic field that make a drawn-out descending "whistle" when picked up and converted to sound. Meteorite hunters have also hit the jackpot in Antarctica, where they have discovered 3,000 samples, most recently a 1-inch, 300-gram moon fragment (SN: 1/22/83, p. 54; 3/26/83, p. 196).



Nat'l Acad. Press

The Southern Ocean is bounded by 60° South latitude, otherwise known as the Antarctic Convergence. Circumnavigating the frozen continent is a clockwise current, which is believed to be instrumental in governing the rest of the earth's weather and ocean movement.

All science considered, the geologists who originally speculated on Antarctica's possible oil deposits have spent the last two years backpedalling. "No known petroleum resources occur in Antarctica," writes John Behrendt, geologist and editor of the recently published U.S. Geological Survey circular, "Petroleum and Mineral Resources of Antarctica." Until a minerals regime is drawn up, the treaty nations are under a "gentlemen's agreement" not to explore for oil or exploit any that may be located. However, Japan, Germany, France and the United States have conducted extensive offshore seismic testing, which could turn up sediments associated with petroleum deposits (SN: 10/29/83, p. 280).

The possibility of another oil embargo and the reality of the currently static world fish catch, both of which have been compounded by countries slamming their coastal doors and imposing exclusive economic zones, have provided an international interest in Antarctica unequalled since the IGY. Long-distance fishing nations like Japan and Russia, desert nations searching for water in the form of icebergs and entrepreneurs who see Antarctica from the eyes of a tourist are among those

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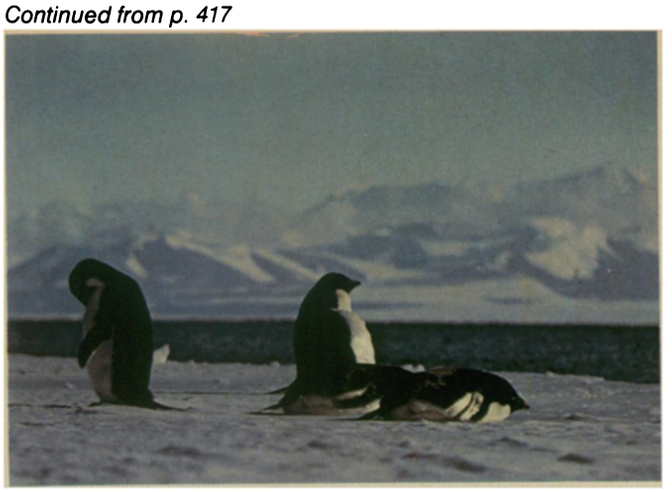

M. Wolfe

At the Antarctic ice edge, the water bubbles with feeding penguins, mammals, krill and fish. In 1980, the Antarctic Treaty nations adopted the Convention on the Conservation of Antarctic Marine Living Resources. It protects all marine resources within the Antarctic Convergence from overexploitation, emphasizing an ecosystem approach.

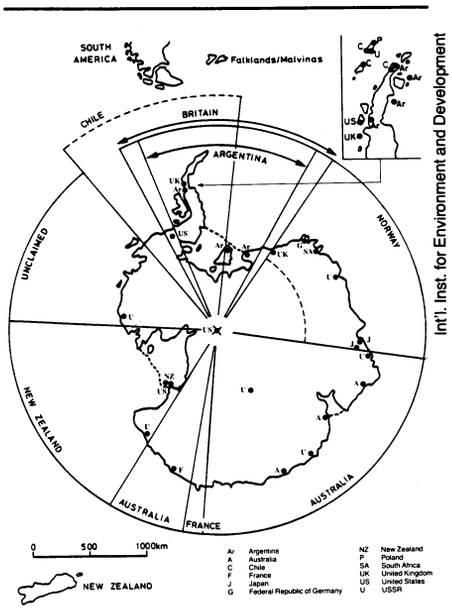

M. Wolfe

Helicopters, supplied by the U.S. Air Force, provide most of the transportation for Antarctic field scientists during the Austral summer (Nov. to Feb.) field season. During the continual daylight, the human population on "the ice" swells to nearly 2,000, dropping to 100 during the incessantly dark seven months of winter when contact with the rest of the world is impossible.

interested in Antarctica's currently accessible exports. Technology is not yet available to export any minerals or petroleum that may be located, but speculation is not absent. Environmentalists, on the other hand, are hoping the continent is set aside as a world park or an "international biosphere reserve."

Most parties involved in the current focus are haunted by political ambiguities. "From the environmentalists' point of view, a UN debate would tamper with the treaty nations' exclusivity in Antarctica, and bringing the issue into an international forum could be disastrous for the Antarctic environment," says Pat Scharlin of the Sierra Club's International Earth Care Center, who watches developments in Antarctica closely. "In this respect we are behind the treaty nations. But, we also feel that the secrecy that the treaty nations practice is wrong and the Group of 77 is correct to challenge this." India, the newest club member, has ironically been at the forefront of the UN nonalignment push for more international say in Antarctic affairs. However, Prime Minister Indira Gandhi, recognizing the prestige involved in conducting Antarctic research, has stated, "In undertaking this advanced work, India has now joined a select band of countries."

"Depending on one's perspective," writes Philip Quigg, "this treaty system



Int'l. Inst. for Environment and Development

Territorial claims for Antarctic land were officially frozen when the Antarctic Treaty was signed in 1959. The claims of Chile, Argentina and Britain overlap. Territorial claims are potentially the most volatile aspect of Antarctic politics, given the potential mineral resources that lie on and off Antarctica's shore.

may be regarded as the last stand of colonialism, an association of the world's largest real estate operators, a political anachronism whose days are numbered, or an astonishingly successful experiment in international cooperation among antagonistic nations."

As the debate increases and sides square off, the UN appears the likely forum for a climax. On November 28, led by Malaysia, the Group of 77 called for a resolution to begin a UN study of "all aspects of Antarctica" — as unusual bedfellows, including the U.S. and the USSR, Britain and Argentina stood together behind the treaty. The resolution was adopted by consensus in a UN committee after an intense debate in which the group outlined two aspects they considered important: first, that the Antarctic continent has an effect on global climatic changes and second, that there is a vast potential for resources in Antarctica that the group does not want to see set aside for club members only.

By far the most threatening aspect to the nonaligned countries is the fact that the treaty nations are privately negotiating a regime for the exploitation of Antarctica's potential mineral deposits. Joseph Bennett at the NSF Division of Polar Programs believes this is a mistake. "The view that there is a potential for exploiting minerals in Antarctica is based on pure speculation," he says. "These new governments that have become interested in Antarctica are only out to reap some resource benefit. Those governments who have spent great sums of money and many years in the interest of science and conservation feel that you've got to pay your dues to participate. We want to prevent a switch in emphasis from conservation to exploitation."

The results of the UN study will be presented to the General Assembly next year. The treaty is up for review by its signatories on whether to continue its existence in 1991. The squabble for sovereignty will undoubtedly continue until then.

In the center of the international stage stands science and all it has represented in Antarctica's history. "The principal product of the treaty is science," says Robert Hoffman at the Marine Mammals Commission in Washington, D.C., who has studied seals on the Antarctic Peninsula. "Science has been completely independent of the politics surrounding Antarctica. The treaty nations have held meetings through all kinds of political conflicts; it was signed in the height of the cold war and meetings have been held during the Falkland Islands incident, when Russia went into Afghanistan and when the Korean jetliner was shot down. None of the incidents were ever mentioned in the meetings. The important thing is that the treaty nations have made an investment that they want to protect, which may not be the case if the treaty were endangered." In the meantime, science is both the cause and effect of man's interest in Antarctica.□